

REMARKS

Claims 1-19 are pending in this application and claims 7-10 are withdrawn. By this Amendment, claims 1, 6 and 14 are amended, and new claim 19 is added. Support for the amendments to claim 1 may be found at least in Figure 1, and claim 6 is amended to correspond with the amendments to claim 1. Furthermore, claim 14 is amended to address an informality. Support for new claim 19 may be found at least in claim 1, Figure 1 and page 5, lines 7-15 of the specification. Thus, no new matter is added by the above Amendment. In view of at least the following, reconsideration and allowance are respectfully requested.

I. Claim Rejection under 35 U.S.C. §112, second paragraph

The Office Action rejects claim 14 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. This rejection is respectfully traversed.

By this Amendment, claim 14 is amended to depend from claim 12, which is a product claim. Accordingly, withdrawal of the rejection is respectfully requested.

II. Claim Rejections under 35 U.S.C. §103

The Office Action rejects claims 1-3, 5, 6 and 11-18 under 35 U.S.C. §103(a) over U.S. Patent No. 5,116,643 (Miller) in view of U.S. Patent No. 5,989,632 (Sanada); rejects claim 4 under 35 U.S.C. §103(a) over Miller in view of Sanada and further in view of U.S. Patent No. 6,777,350 (Nakagawa); and further rejects claims 13 and 14 under 35 U.S.C. §103(a) over Miller in view of Sanada and further in view of WO 03/023858 (Inoue). U.S. Patent Publication No. 2003/0227803 (Natori) is cited as an English translation of Inoue¹. These rejections are respectfully traversed.

By this Amendment, independent claim 1 recites, in part, "rotating the substrate at a first speed for a first time; rotating the substrate at a second speed lower than the first speed

¹ Natori is a continuation of PCT JP 02/09032.

for a second time, the second time being longer than the first time; rotating the substrate at a third speed higher than the second speed for a third time; and forming the ceramic film including a perovskite structure by a heat treatment."

Applicants respectfully submit that the applied art references do not disclose or establish any reason to provide at least the above-recited features of independent claim 1. Specifically, Miller generally discloses a method for producing thin films suitable for fabricating ferroelectric thin films in which a predetermined amount of a precursor is dissolved in a solvent so that a hydrolyze reaction will occur for each metal precursor (abstract). Thereafter, in the method disclosed by Miller, water is added to begin a hydrolysis reaction, and then the solution is heated to drive off excess water and solvent (abstract). However, Miller does not disclose or establish any reason to provide a method that includes at least the varied rotational speeds and rotation times as recited in independent claim 1.

Sanada does not cure the above-discussed deficiencies in Miller. Specifically, Sanada relates to a method for applying a coating solution to a surface of a substrate to form a film of a specific thickness (abstract). Sanada discloses that the substrate is first spun at a low speed while the coating is applied, the substrate is then decelerated to a predetermined standby rotational frequency, and then the substrate is accelerated to a speed that is higher than the first speed (abstract). Figures 5 and 17 of Sanada illustrate the relationship between the rotational frequency and the duration of each frequency stage for the method disclosed in Sanada. Both Figures 5 and 17 illustrate the second rotational speed, which is less than the first and third rotational speeds, as occurring for a shorter period of time than the first and third rotational speeds. Therefore, Sanada at least does not disclose or establish any reason to provide "rotating the substrate at a second speed lower than the first speed for a second time, the second time being longer than the first time," as recited in claim 1.

Furthermore, the specification of the present application provides an operational advantage associated with the above-recited method of manufacturing a ceramic film. Specifically, the specification provides that the period of time in which the ceramic material remains on the base is increased by performing the second rotational step at a lower speed or stopped before the third rotational step (page 4, lines 2-5). The specification further discloses that the period of time in which the ceramic material comes in contact with an electrode would increase, such that a good effect may be exerted on the resulting crystal structure (page 4, lines 5-8). As such, the method recited in claim 1 provides an operational advantage in which a good effect may be exerted on the resulting crystal structure because the period of time in which the ceramic material remains on the base is increased.

Nakagawa, Inoue and Natori also do not cure the above-discussed deficiencies in Miller and Sanada. Specifically, Nakagawa generally discloses rotating the substrate while forming a material film with a liquid on the substrate. Moreover, the Office Action relies on Inoue and Natori as allegedly teaching the feature that Si or Ge in the paraelectric phase may be used in a PLZT thin film.

The applied art references, individually or in any combination, do not disclose or establish any reason to provide the features recited in claim 1 for at least the reasons discussed above. Therefore, the applied art references fail to render obvious the subject matter of independent claim 1, and the claims dependent therefrom.

Accordingly, withdrawal of the rejections are respectfully requested.

III. New Claim

By this Amendment, new claim 19 is added. Claim 19 recites, in part, "applying a ceramic material to the substrate; rotating the substrate at a first speed for a first time; rotating the substrate at a second speed lower than the first speed for a second time, the second time being longer than the first time; rotating the substrate at a third speed higher than the second

speed for a third time." Therefore claim 19 is allowable at least for the reasons that claim 1 is allowable, as discussed above.

Furthermore, claim 19 recites, in part, "blowing gas onto the ceramic material at a first temperature; and heating the substrate by a hot plate at a second temperature, the blowing and the heating being conducted simultaneously, and the first temperature being lower than the second temperature."

The prior art references of record also do not disclose the above-recited features of new independent claim 19. Specifically, Nakagawa does not disclose or establish any reason to provide blowing a gas onto the ceramic material while heating the substrate by a hot plate as recited in claim 19. Nakagawa merely discloses that the material film may be dried while rotating the substrate and letting air or nitrogen gas blow onto a predetermined area of the material film (col. 2, lines 23-26 and 36-39). In an alternate embodiment, Nakagawa discloses using a gas-blowing nozzle in opposition to the substrate, which blows gas onto the substrate (col. 2, lines 44-47). Moreover, Nakagawa does not disclose or establish any reason to provide the varied temperatures at which a gas is blown onto the ceramic material and the substrate is heated by a hot plate, as recited in claim 19.

For at least the reasons discussed above, the art references of record do not disclose or establish any reason to provide the features recited in claim 19. Therefore, the art references of record do not anticipate or render obvious the subject matter of independent claim 19.

According, allowance of new claim 19 is respectfully requested.

IV. Rejoinder

Upon allowance of independent claim 1, rejoinder of withdrawn claims 7-10 is respectfully requested. Specifically, claims 7-10 variously depend from independent claim 1. Therefore, claims 7-10 are allowable at least for the reasons that claim 1 is allowable, as discussed above. See MPEP §821.04.

V. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the pending claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:
RCE Transmittal

Date: December 18, 2008

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